ESD Association Standard Test Method

ANSI/ESD STM9.1-2022

ANSI/ESD STM9.1-2022

Revision and Consolidation of ANSI/ESD STM9.1-2014
and ANSI/ESD SP9.2-2020

For the Protection of Electrostatic Discharge Susceptible Items

Footwear and Foot Grounders Resistive Characterization

EOS/ESD Association, Inc.
218 West Court Street
Rome, NY 13440

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Footwear and Foot Grounders Resistive Characterization

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FOREWORD

This standard test method[1] is intended to provide a test method for evaluating the resistance of footwear and foot grounders (for example, shoes, boots, heel straps, toe grounders, sole grounders, and shoe covers/booties).

This test method is limited to defining procedures for measuring the electrical resistance of footwear and foot grounders only and does not address electrical resistance through a person in combination with flooring systems. For this test method, see ANSI/ESD STM97.1. For voltage generation in combination with a person, see ANSI/ESD STM97.2.

A common source of electrostatic charge in a work environment is the separation of the foot from the floor when walking, resulting in the generation of electrostatic charge that can accumulate on personnel. The appropriate selection of footwear can minimize the effect of this generation and accumulation.

To effectively control electrostatic charges, footwear and foot grounders must be used in conjunction with floor systems defined in ANSI/ESD STM7.1.

Footwear and foot grounders may also pose an electrical hazard unless properly designed and worn in appropriate environments. The test method described in this document does not guarantee electrical hazard reduction.

This standard test method was originally designated ESD S9.1-1995 and approved on June 5, 1995. ANSI/ESD STM9.1-2001 was a reaffirmation, re-designation of ESD S9.1-1995 and was approved on February 4, 2001. ANSI/ESD STM9.1-2006 was a reaffirmation of ANSI/ESD STM9.1-2001 and was approved on June 11, 2006. ANSI/ESD STM9.1-2014 was a revision of ANSI/ESD STM9.1-2006 and was approved on September 2, 2012. ANSI/ESD STM9.1-2022 is a revision and consolidation of ANSI/ESD STM9.1-2014 and ANSI/ESD SP9.2-2019 and was approved on March 24, 2022

[1] **ESD Association Standard Test Method (STM):** A definitive procedure for the identification, measurement, and evaluation of one or more qualities, characteristics, or properties of a material, product, system, or process that yields **reproducible test** results.

At the time ANSI/ESD STM9.1-2022 was prepared, the 9.0 Footwear Subcommittee had the following members:

Dale Parkin, Chair
Seagate Technology

Nate Ashworth
Julie Industries, Inc.

Stephen Blackard
II-VI

Mary Kay Botkins
ACL Staticide

Kevin Duncan
Seagate Technology

David Girard
Staticon Support Services

Fatjon "Toni" Gurga
Reliant ESD

Shane Heinle
Digi-Key Corporation

Matt Jane
Tesla

John Kinnear
IBM

Michael Manders
The United States Air Force

Chuck McClain
Micron Technology

Andrew Nold
Teradyne, Inc.

Daniel O'Brien
University of Dayton Research Institute

Keith Peterson
Missile Defense Agency

Pawel Rekas
Kimball Electronics Poland Sp. z o. o.

Thomas Ricciardelli
SelecTech/Static Stop

Wolfgang Stadler
Intel Deutschland GmbH

David E. Swenson
Affinity Static Control Consulting

Bob Vermillion
RMV Technology Group, LLC

Craig Zander
Transforming Technologies

The following individuals contributed to the development of ESD S9.1-1995, ESD SP9.2-2003, ANSI/ESD STM9.1-2014, and/or ANSI/ESD SP9.2-2019:

Lt. Victoria L. Ambuehl, Chair
USAF

Nate Ashworth
Julie Industries, Inc.

Ben Baumgartner
Lockheed

Brent Beamer
Static Control Components, Inc.

Mary Kay Botkins
ACL Staticide

Larry Burich
Lockheed Martin

Ken Dille
Red Wing Shoe Co.

Kevin Duncan
Seagate Technology

Mark Fancourt
Lehigh Safety Shoe Co.

Peter Freeman
Hewlett Packard

Steve Gerken
USAF

Ron Gibson
Celestica

David Girard
Honeywell Aerospace

Shane Heinle
Digi-Key Corporation

Meghan Hodge
3M

David Howlett
HY-Test

Paul Isenberg
H.H. Brown Shoe Co.

Erling Krog-Jensen
Ericsson Telecom AB

Sharon Kaminskas

William Klein
K&S Laboratories, Inc.

Steve Koehn
3M Company

Bruce Lampert
United Technical Products, Inc.

Huan Li
JDSU

Michael J. Manders
United States Air Force (USAF)

Gregory Manning
NASA/ARES Technical Services

Charles McClain
NorthWest Electrostatic Services, LLC

Daniel O'Brien
University of Dayton Research Institute

Dale Parkin
Seagate Technology

Alan Peters
Lehigh Safety Shoe Co.

Keith Peterson
Missile Defense Agency

Paul Petersen
3M Company

Thomas Ricciardelli
SelecTech/Static Stop

Francisco Rodriguez
3M

Gheorghe Rugila
Lexmark, Inc.

Don Stella
Iron Age

Anna Maria Steriti
Wescorp

Wayne Tan
Advanced Micro Devices

Robert Vermillion
RMV Technology Group, LLC

Craig Zander
Transforming Technologies

Sheryl Zayic
Boeing

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ESD Association Standard Test Method for the Protection of Electrostatic Discharge Susceptible Items – Footwear and Foot Grounders – Resistive Characterization

1.0 PURPOSE AND SCOPE

1.1 Purpose

This document provides methods to measure the electrical resistance of footwear and foot grounders.

1.2 Scope

This standard test method applies to all footwear and foot grounders, including, but not limited to shoes, boots, heel straps, toe grounders, sole grounders, and shoe covers/booties.

2.0 REFERENCED PUBLICATIONS

ESD ADV 1.0, ESD Association Glossary of Terms[2]

ANSI/ESD STM11.11, Surface Resistance Measurement of Static Dissipative Planar Material[2]

ASTM D257, Standard Test Method for D-C Resistance or Conductance of Insulating Materials[3]

ASTM D2240, Standard Test Method for Rubber Property – Durometer Hardness[3]

3.0 DEFINITIONS

The terms used in the body of this document are in accordance with the definitions found in ESD ADV1.0, ESD Association's Glossary of Terms, available for complimentary download at www.esda.org.

footwear (shoes/boots). A covering for the human foot that has properties to control the generation and dissipation of static charge when used in conjunction with a static control floor, floor finish, or floor mat.

body contacting mechanism (BCM). The part of the footwear or foot grounder that makes electrical contact with the body.

floor contacting surface (FCS). The part of the footwear or foot grounder that makes electrical contact with the grounding surface.

foot grounder. A personal grounding device that is worn on the shoe. The device makes electrical contact between the wearer and the surface on which the wearer is standing. This definition includes sole/heel/toe grounders and shoe covers/booties or similar devices.

shot. A collective term for small metal balls, spheres, or pellets with a diameter of ≤ 3 mm.

4.0 PERSONNEL SAFETY

4.1 THE PROCEDURES AND EQUIPMENT DESCRIBED IN THIS DOCUMENT MAY EXPOSE PERSONNEL TO HAZARDOUS ELECTRICAL CONDITIONS. USERS OF THIS DOCUMENT ARE RESPONSIBLE FOR SELECTING EQUIPMENT THAT COMPLIES WITH APPLICABLE LAWS, REGULATORY CODES, AND BOTH EXTERNAL AND INTERNAL POLICY. USERS ARE CAUTIONED THAT THIS DOCUMENT CANNOT REPLACE OR SUPERSEDE ANY REQUIREMENTS FOR PERSONNEL SAFETY.

[2] EOS/ESD Association, Inc. 218 West Court Street, Rome, NY 13440, +1 315-339-6937, www.esda.org

[3] American Society for Testing and Materials (ASTM), 100 Barr Harbor Dr., PO Box C700, West Conshohocken, PA 19428-2959, USA, 877-909-2786, www.astm.org